

*A Table of the Elastick power of the Air,  
both Experimentally and Hypothetically calculated,  
according to its various Dimensions.*

The dimen- sions of the included Air.	The height of the Mer- curial Cylin- der counter- pois'd by the Atmo- sphere.	The Mercu- rial Cylinder added, or taken from the former.	The sum or diffe- rence of these two Cylinders.	What they ought to be accor- ding to the Hypo- thesis.
12	29 +	29 =	58	58
13	29 +	$24\frac{11}{16}$ =	$53\frac{11}{16}$	$53\frac{7}{16}$
14	29 +	$20\frac{3}{16}$ =	$49\frac{3}{16}$	$49\frac{1}{16}$
16	29 +	14 =	43	$43\frac{1}{2}$
18	29 +	$9\frac{1}{2}$ =	$38\frac{1}{2}$	$38\frac{1}{2}$
20	29 +	$5\frac{3}{16}$ =	$34\frac{3}{16}$	$34\frac{1}{4}$
24	29	0 =	29	29
48	29 —	$14\frac{5}{8}$ =	$14\frac{3}{8}$	$14\frac{1}{2}$
96	29 —	$22\frac{1}{8}$ =	$6\frac{7}{8}$	$7\frac{1}{8}$
192	20 —	$25\frac{5}{8}$ =	$3\frac{3}{8}$	$3\frac{1}{8}$
384	29 —	$27\frac{7}{8}$ =	$1\frac{6}{8}$	$1\frac{7}{16}$
576	29 —	$27\frac{7}{8}$ =	$1\frac{1}{8}$	$1\frac{5}{24}$
768	29 —	$28\frac{1}{8}$ =	$0\frac{7}{8}$	$0\frac{7}{24}$
960	29 —	$28\frac{1}{8}$ =	$0\frac{5}{8}$	$0\frac{5}{12}$
1152	29 —	$28\frac{7}{16}$ =	$0\frac{9}{16}$	$0\frac{10}{16}$

From

From which Experiments, I think, we may safely conclude, that the Elater of the Air is reciprocal to its extension, or at least very near. So that to apply it to our present purpose (which was indeed the chief cause of inventing these wayes of tryal) we will suppose a *Cylinder* indefinitely extended upwards, [I say a *Cylinder*, not a piece of a *Cone*, because, as I may elsewhere shew in the Explication of Gravity, that *triplicate* proportion of the shels of a Sphere, to their respective diameters, I suppose to be removed in this case by the decrease of the power of Gravity] and the pressure of the Air at the bottom of this *Cylinder* to be strong enough to keep up a *Cylinder* of *Mercury* of thirty inches: Now because by the most accurate tryals of the most illustrious and incomparable Mr. Boyle, published in his deservedly famous Pneumatick Book, the weight of Quicksilver, to that of the Air here below, is found near about as fourteen thousand to one: If we suppose the parts of the *Cylinder* of the *Atmosphere* to be every where of an equal density, we shall (as he there deduces) find it extended to the height of thirty five thousand feet, or seven miles: But because by these Experiments we have somewhat confirm'd the hypothesis of the reciprocal proportion of the Elaters to the Extensions we shall find, that by supposing this *Cylinder* of the *Atmosphere* divided into a thousand parts, each of which being equivalent to thirty five feet, or seven geometrical paces, that is, each of these divisions containing as much Air as is suppos'd in a *Cylinder* near the earth of equal diameter, and thirty five foot high, we shall find the lowermost to press against the surface of the Earth with the whole weight of the above mentioned thousand parts; the pressure of the bottom of the second against the top of the first to be  $1000 - 1 = 999$ . of the third against the second to be  $1000 - 2 = 998$ . of the fourth against the third to be  $1000 - 3 = 997$ . of the uppermost against the 999. or that next below it, to be  $1000 - 999 = 1$ . so that the extension of the lowermost next the Earth, will be to the extension of the next below the uppermost, as 1. to 999. for as the pressure sustained by the 999. is to the pressure sustain'd by the first, so is the extension of the first to the extension of the 999. so that, from this hypothetical calculation, we shall find the Air to be indefinitely extended: For if we suppose the whole thickness of the Air to be divided, as I just now instanced, into a thousand parts, and each of those under differing Dimensions, or Altitudes, to contain an equall quantity of Air, we shall find, that the first *Cylinder*, whose Base is supposed to lean on the Earth, will be found to be extended  $35\frac{35}{999}$  foot; the second equal Division, or *Cylinder*, whose *basis* is supposed to lean on the top of the first, shall have its top extended higher by  $35\frac{70}{998}$ ; the third  $35\frac{105}{997}$ ; the fourth  $35\frac{140}{996}$ ; and so onward, each equal quantity of Air having its dimensions measured by 35. and some additional number exprest alwayes in the manner of a fraction, whose numerator is alway the number of the place multipli'd by 35. and whose denominator is alwayes the pressure of the *Atmosphere* sustain'd by that part, so that by this means we may easily calculate the height of 999. divisions of those 1000. divisions, I suppos'd; whereas the uppermost

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